

Advanced Algebra - Exponential Functions
Assignment # _____

Name _____

Solve.

1. $5^3 = 5^{2x-1}$

2. $9^x = 3^{x+4}$

3. $2^{3x-1} = 4^{x+2}$

4. $5^{x-1} = 125^{2x+3}$

5. $8^{2x-2} = 4^{2-x}$

6. $(1/3)^{x-3} = 3^{x-1}$

7. $6^{3x-5} = 36^{4x+10}$

8. $100^x = 0.01$

9. $25^{2x+1} = 125^{x+2}$

10. $7^{2x+4} = (1/49)^{x-3}$

11. $125^{x+3} = (1/25)^{3x+6}$

12. $(1/32)^{x+3} = (1/8)^{x-3}$

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Name Key

Solve.

1. $5^3 = 5^{2x-1}$

$$\begin{aligned} 3 &= 2x-1 \\ 4 &= 2x \\ x &= 2 \end{aligned}$$

2. $9^x = 3^{x+4}$

$$\begin{aligned} (3^2)^x &= 3^{x+4} \\ 2x &= x+4 \\ x &= 4 \end{aligned}$$

3. $2^{3x-1} = 4^{x+2}$

$$\begin{aligned} 2^{3x-1} &= (2^2)^{x+2} \\ 3x-1 &= 2x+4 \\ x &= 5 \end{aligned}$$

4. $5^{x-1} = 125^{2x+3}$

$$5^{x-1} = (5^3)^{2x+3}$$

$$\begin{aligned} x-1 &= 6x+9 \\ -5x &= 10 \\ x &= -2 \end{aligned}$$

5. $8^{2x-2} = 4^{2-x}$

$$(2^3)^{2x-2} = (2^2)^{2-x}$$

$$\begin{aligned} 6x-6 &= 4-2x \\ 2x &= 4 \\ x &= 5/4 \end{aligned}$$

6. $(1/3)^{x-3} = 3^{x-1}$

$$(3^{-1})^{x-3} = 3^{x-1}$$

$$\begin{aligned} 3^{-x+3} &= 3^{x-1} \\ -x+3 &= x-1 \\ 4 &= 2x \\ x &= 2 \end{aligned}$$

7. $6^{3x-5} = 36^{4x+10}$

$$6^{3x-5} = (6^2)^{4x+10}$$

$$\begin{aligned} 3x-5 &= 8x+20 \\ -25 &= 5x \\ x &= -5 \end{aligned}$$

8. $100^x = 0.01$

$$(10^2)^x = 10^{-2}$$

$$2x = -2$$

$$x = -1$$

9. $25^{2x+1} = 125^{x+2}$

$$(5^2)^{2x+1} = (5^3)^{x+2}$$

$$4x+2 = 3x+6$$

$$x = 4$$

10. $7^{2x+4} = (1/49)^{x-3}$

$$7^{2x+4} = \left(\frac{1}{7^2}\right)^{x-3}$$

$$7^{2x+4} = (7^{-2})^{x-3}$$

$$2x+4 = -2x+6$$

$$4x = 2$$

$$x = 1/2$$

11. $125^{x+3} = (1/25)^{3x+6}$

$$(5^3)^{x+3} = \left(\frac{1}{5^2}\right)^{3x+6}$$

$$3x+9 = -6x+12$$

$$9x = -3$$

$$x = -1/3$$

12. $(1/32)^{x+3} = (1/8)^{x-3}$

$$\left(\frac{1}{2^5}\right)^{x+3} = \left(\frac{1}{2^3}\right)^{x-3}$$

$$(2^{-5})^{x+3} = (2^{-3})^{x-3}$$

$$-5x-15 = -3x+9$$

$$-24 = 2x$$

$$x = -12$$